

REMARKS AND RESPONSES

Claim 1 has been amended, and claims 2-5 are newly added. As a result, claims 1-5 remain pending in the present application. Support for the amendments is found in the specification and claims as filed. Accordingly, the amendments do not constitute the addition of new matter. Reconsideration of the application in view of the foregoing amendments and following comments is respectfully requested.

Sequence Rules Compliance

With respect to the Paragraph 2 of the Office Action, the Fig. 4 as filed has been amended to new Fig. 3. In the new Fig. 3, 313 amino acids is recited to eliminate the clerical error. Applicants hereby cancel the previously paper copies of the Raw Sequence Listing, presented as Paper 6 (9/6/01), Paper 12 (3/11/02), and Paper 18(7/25/02).

Drawings

With respect to Paragraph 3 of the Office Action, amended and new figures are submitted to replace the original figures. The Fig. 1 is amended, and new Figs. 2, 3, and 5 are submitted to replace the original Figs. 2, 4, and 3. Original Fig. 5 has been cancelled, and new Fig. 4 has been added. These amended and new figures all have acceptable margins, line widths, and numbers.

Accordingly, Applicant respectfully requests the objection to be withdrawn.

Specification

With respect to Paragraph 4 of the Office Action, hyperlinks in the specification and figures have been eliminated. Accordingly, Applicant respectfully requests the objection to be withdrawn.

Priority

With respect to Paragraph 5 of the Office Action, new claim 5 is submitted to claim a method of finding candidates for peptides being covered on an electronic nose for detecting a gas. The disclosure of the parent application, 09/057,181 does not provide an enabling basis to aid the artisan in constructing the biosensor as claimed in claim 1. However, the disclosure of the parent application provides an enabling basis for each step in the new claim 5 to aid persons skilled in the art in finding candidates for peptides being covered on an electronic nose for detecting a gas.

Accordingly, applicant respectfully submits that an enabling disclosure is provided by the parent application for the new claim 5.

Claim Rejection - 35 U.S.C. 112

With respect to Paragraphs 6 and 7 of the Office Action, the Office Action rejected claim 1 under 35 U.S.C. 112, second paragraph as being indefinite. Specially, the Office Action stated that these claims are rejected for not providing a clear definition of the term "ligand for an olfactory receptor protein".

In claim 1, “a ligand for an olfactory receptor protein” has been amended to --a ligand being capable of binding an olfactory receptor protein-- to clearly define that a ligand means any molecule that binds to a macromolecule. Accordingly, Applicant respectfully submits that no new matter has been added by this change and further respectfully request the rejection to be withdrawn.

With respect to Paragraphs 8 and 9 of the Office Action, the Office Action rejects claim 1 under 35 U.S.C. 112, first paragraph, because the specification does not reasonably provide enablement for methods involving any other peptide and nor for the broadly claimed method of making a biosensor capable of detecting a molecule wherein the molecule is a ligand for an olfactory receptor.

Accordingly, Applicant submits that the specification of the present application has been enriched to provide enabling details, based on the specification and claims as filed, about how to fabricate an olfactory receptor-based biosensor. The present application provides an efficient method to find peptides that can bind a selected gas with high affinity. In the present application, an ORP is viewed as a biopolymer having multiple functional groups to provide peptide fragments capable of binding a selected gas. Hence, this method, provided by the present application, is much more efficient than designing a biopolymer *de novo* and trying to find the biopolymer capable of binding a selected gas or not. However, tertiary structures of most ORPs are unknown and hard to be solved through X-ray crystallography or other traditional tools. Therefore, the present application used existing programs and databases to predict an approximate tertiary structure of an ORP to find candidate peptide fragments from the

ORP. The results prove that this method is worked and efficient, comparing with the traditional tools. Moreover, Applicant has other pending US applications (application number: 10/262,832 and 10/321,652) and one publication (Sensors and Actuators B 76, 2001, 177-180) about peptides that can detect ammonia, sulfur compounds or amine compounds. The works mentioned above all utilized the method provided by the present application.

Based on the problems mentioned by the Office Action, Applicant has added the enabling details to the amended specification. For the problems mentioned in the last paragraph on page 6 to first paragraph on page 7 of the Office Action, the amended specification provided another two peptides, B2 and B3, which are synthesized according to the method provided by the present application, in Table 6 of the amended specification. The corresponding enabling disclosure is provided on pages 13-15 of the CLEAN VERSION of the amended specification. Although one has to do experiments to know how sensitive the peptides fragments of an ORP is to bind a gas, it is not merely trial and error experimentation. Since computational modeling has provide very limited number of peptides candidates from the most probably binding domains of the ORP, only routine experimentation is needed and undue experimentation is avoided.

For the problems mentioned in the second paragraph on page 7 to the second paragraph on page 9 of the Office Action, the present application does not intend to construct a "true" tertiary structure of an active ORP or to find a "true" ligand of a receptor. As mentioned above, the present application only want to find a biopolymer

that can bind a selected gas from existing proteins, since designing a biopolymer being capable of binding a certain molecule by human is very difficult and time consuming. Since Bioinformatics has been and still is rapidly developed, the present application utilized the existing program and database to get an approximate protein structure of an ORP and in turn used the approximate ORP's structure to find most probably binding domains for a selected gas. Then, peptides are synthesized according to the most probably binding domains and coated on the surface of a gold electrode on piezoelectric quartz to detect the selected gas. As described in the amended specification, Applicant found at least three peptides, B1, B2, and B3, from the OLFD_CANFA (P30955) for binding trimethylamine. All of the enabling details are provided in the amended specification. Accordingly, Applicant respectfully requests the rejection to be withdrawn.

Claim Rejection - 35 U.S.C. § 102

With respect to Paragraphs 10-12 of the Office Action, the Office Action rejected claim 1 under 35 U.S.C. §102 as being anticipated by Wu, T-Z et al Journal of Biotechnology 80(63-73), July 15, 2000 and Gao et al (U.S. 6,218,507), respectively.

The following is a quotation of 35 U.S.C. §102(a):

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

With particular reference to Wu, the publication date is July 15, 2000, as stated in the Paragraph 11 of the Office Action. However, the filing date of the present application is March 28, 2000. Since the filing date of the present application is earlier than Wu's publication date, Wu cannot be a 35 U.S.C. §102(a) reference to reject the claim 1 of the present application.

The following is a quotation from MPEP §2131:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Gao disclose a peptide and analogues thereof, which is a fragment of an olfactory receptor protein capable of selectively binding to trimethylamine, and a method and a device for detecting trimethylamine by using the peptide and the analogues thereof. However, col 1, L52-64 of Gao only disclose that the gene family of the olfactory receptor proteins were cloned and characterized and the protein sequences of the odorant receptors were determined. Nothing is related to compute the secondary or the tertiary structure of an ORP. Therefore, Gao does not disclose every limitations of the amended claim 1.

Accordingly, Applicant respectfully submits that independent claim 1 as amended is allowable over the art of record and respectfully requests the 35 U.S.C. §102(e) rejection of claim 1 to be reconsidered and withdrawn. Reconsideration and withdrawal of this rejection is respectfully requested.

New Claims

New claims 2-5 are submitted with more specific features than the amended claim 1. Hence, claims 2-5 are also in condition for allowance. Early and favorable indication of allowance is courteously solicited.

Conclusions

For all of the above reasons, applicants submit that the specification and claims are now in proper form, and that the claims define patentably over prior arts. Therefore applicants respectfully request issuance for this case at the Office Action's earliest convenience.

Respectfully submitted,



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